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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/561,830	12/22/2005	Ryotaro Hayashi	SHIGA7.040APC	5909

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EXAMINER

EOFF, ANCA

ART UNIT	PAPER NUMBER
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1795

NOTIFICATION DATE	DELIVERY MODE
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11/26/2008

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/561,830	Applicant(s) HAYASHI ET AL.	
	Examiner ANCA EOFF	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 October 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-5,7,8 and 12-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 3-5, 7,8 and 12-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>08/21/2008</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1, 3-5, 7-8 and 12-23 are pending. Claims 1, 6 and 9-11 have been canceled.
2. The foreign priority documents JP 2003-189707 filed on July 01, 2003 and JP 2004-119498 filed on April 14, 2004 were received and acknowledged. However, in order to benefit of the earlier filing dates, certified English translations are required.

Continued Examination Under 37 CFR 1.114

3. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on October 08, 2008 has been entered.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

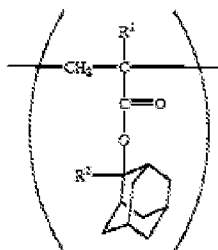
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 3-5, 7, 12-20 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujishima et al. (US Patent 6,239,231).

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With regard to claims 1, 3-5 and 17, Fujishima et al. disclose a chemical amplifying positive resist composition comprising a resin, an acid generator (abstract) and a solvent (column 9, lines 1-15). The resin comprises:

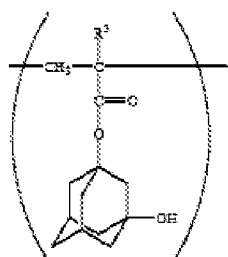
- an unit of 2-alkyl-2-adamantyl (meth)acrylate of formula (I):



(I) (formula (I) in column 2, lines 35-45), wherein R^1 represents hydrogen or methyl and R^2 represents an alkyl (column 2, lines 50-51).

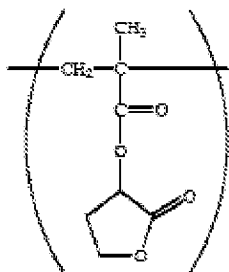
The alkyl-2-adamantyl in this unit is cleaved by the action of an acid and hence this unit contributes to the enhancement of alkali-solubility after exposure of the resist film (column 4, lines 44-51). Fujishima et al. also disclose that other polymerization units with acid-cleavable groups may be comprised in the resin (column 5, lines 56-59).

- an unit of 3-hydroxy-1-adamantyl(meth)acrylate of formula (II):



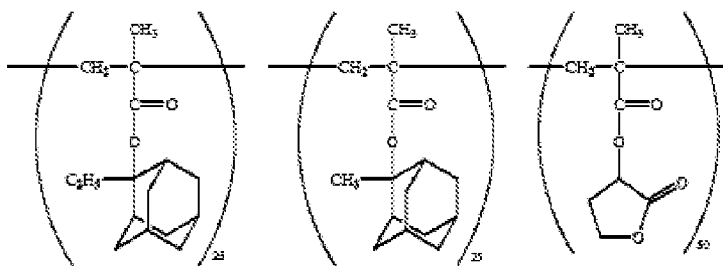
(II) (formula (II) in column 2, lines 55-65), wherein R^3 represents hydrogen or methyl (column 3, line 1).

- an unit of α -methacryloyloxy- γ -butyrolactone represented by the formula (III):



(III) (formula (IV) in column 3, lines 14-15 and 25-35).

Fujishima et al. disclose the polymer (IV), which shows polymerization units with acid-cleavable groups used in combination:



(IV) (Resin I in columns 15-16).

The resin (IV) comprises:

- a first unit of 2-ethyl-2-adamantyl methacrylate which is equivalent to the unit (a1) of formula (I) of the instant application, wherein R is a methyl group and R¹ is an ethyl group;
- a second unit of 2-methyl-2-adamantyl methacrylate which is equivalent to the unit (a2) of formula (III) of the instant application, wherein R is a methyl group, and
- a third unit equivalent to the unit (a3) containing a lactone group of the instant application.

Fujishima et al. do not specifically disclose a resin comprising the units (a1), (a2), (a3), (a4) of the instant application. However, it would have been obvious to one of

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ordinary skill in the art at the time of the invention to obtain such a resin, based on Fujishima's teachings about the units (I), (II) and (III) that may form the resin and the teaching that other acid-cleavable unit (I) may be used in combination with other acid-cleavable unit.

Fujishima et al. disclose that the unit (I) and other polymerization units having an acid-cleavable group are preferably 30-80 mol% based on the total amount of the resin (column 6, lines 18-26).

Fujishima et al. disclose that the unit (III) is comprised in an amount of 20-70 mol% of the resin (column 6, lines 32-39).

With regard to claims 7 and 18, Fujishima et al. disclose that the resin comprises an unit (III), equivalent to the unit (a3) of the instant application (column 3, lines 14-15 and 25-35).

With regard to claim 12, Fujishima et al. disclose that the acid generator may be diphenyliodonium trifluoromethanesulfonate (column 6, line 66), which is equivalent to the onium salt with a fluorinated alkylsulfonate anion used as acid generator (B) of the instant application.

With regard to claim 13, Fujishima et al. disclose that the chemical amplifying positive resist composition comprises nitrogen-containing organic compounds, such as amines (column 8, lines 9-56).

With regard to claim 14, Fujishima et al. disclose a process comprising the steps of:

- applying the resist composition to a substrate to form a resist film;

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- drying the resist film,
- exposing for patterning;
- performing a heat-treatment, wherein the heat-treatment is equivalent to the post-exposure bake of the instant application, and
- developing with an alkali developer (column 9, lines 16-19).

With regard to claim 15-16, Fujishima et al. disclose that the heat-treatment (post-exposure bake) of the resist composition comprising the resin (IV) is performed at 110°C (see Example 8 in table 2. column 19).

As the first and second repeating units of the polymer (IV) are equivalent to the units (a1) and (a2) of the copolymer of the instant application and absent a record to the contrary, it is the examiner's position that the limitations of claim 15 are met.

With regard to claim 19, Fujishima et al. disclose that the resin comprises the 3-hydroxy-1-adamantyl (meth)acrylate unit (formula (II) above) in an amount in the range of 20-70 mol% (column 6, lines 32-39) and this unit is equivalent to the unit (a4) of the instant application.

With regard to claim 20, Fujishima et al. disclose that the resin may comprise a (meth)acrylonitrile unit (column 2, lines 29-31, column 3, lines 5-10 and column 3, line 63-column 4, line 16), which is equivalent to the unit (a5) which contains no acid dissociable, dissolution inhibiting groups, lactones or hydroxyl groups of the instant application.

With regard to claim 22, Fujishima et al. disclose that the solvent used for the resist composition may be propylene glycol monomethyl ether acetate (PGMEA),

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ethyl lactate, γ -butyrolactone or a combination thereof (column 9, lines 1-15). Fujishima et al. specifically disclose a mixture of PGMEA and γ -butyrolactone (column 18, line 67 - column 19, line 1).

6. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fujishima et al. (US Patent 6,239,231) in view of Nishimura et al. (US Pg-Pub 2002/0009667).

With regard to claim 8, Fujishima et al. teach the resist composition of claim 1, wherein the resin comprises units (a1), (a2), (a3) and (a4) (see paragraph 5 of the Office Action) but fail to teach that the resin may be mixed with a polymer containing units (a3).

Nishimura et al. disclose a chemically amplified positive tone resist comprising a resin (A), which contains a lactone-ring structure and acid dissociating groups (par.0056).

Nishimura et al. further disclose that the resin (A) may be used either individually or in combination of two or more (par.0266).

As Nishimura et al. teach that mixture of resins may be used in a chemically amplified positive tone resist, it would have been obvious to one of ordinary skill in the art at the time of the invention to use a combination of resins in the chemically amplified resist of Fujishima et al., with a reasonable expectation of success.

The resins of Fujishima et al. comprise repeating units with lactone rings, equivalent to the unit (a3) of the instant application (see Resins A and C in column 11-12, Resins E and G in column 14).

7. Claims 21 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujishima et al. (US Patent 6,239,231) in view of Hada et al. (WO 03/048863, wherein the citations are from the English equivalent US Pg-Pub 2004/0058269).

With regard to claim 21, Fujishima et al. teach the resist compositions of claim 20 above (see paragraph 5 of the Office Action), wherein the resist composition comprises a resin with units (a1), (a2), (a3), (a4) and (a5) but fail to disclose that the resin may contain an unit (a5) comprising an aliphatic polycyclic group derived from a methacrylate ester.

Hada et al. disclose a chemically amplified positive type resist composition comprising a resin (A) for which the solubility in alkali increases under the action of an acid and an acid generator (B) which generates acid on exposure (par.0012), wherein the resin (A) is a copolymer comprising:

- an unit (a1) derived from a (meth)acrylate ester comprising a acid dissociable, dissolution inhibiting group;
- an unit (a2) derived from a (meth)acrylate ester comprising a lactone containing monoecyclic or polycyclic group;
- an unit (a3) derived from a (meth)acrylate ester comprising a hydroxyl group containing polycyclic group and
- an unit (a4) derived from a (meth)acrylate ester comprising a polycyclic group which is different from the unit (a1), (a2) and (a3) (par.0012).

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The chemically amplified positive type resist composition of Hada et al. displays excellent resolution and enables improvement in the depth of focus range of an isolated resist pattern and suppression of any proximity effect (par.0010).

The unit (a1) of Hada et al. (par.0020-0023) is equivalent to the unit of formula (I) of Fujishima et al. and the units (a1), (a2) of the instant application.

The unit (a2) of Hada et al. (par.0028-0032) is equivalent to the α -methacryloyloxy- γ -butyrolactone unit (III) of Fujishima et al. and to the unit (a3) of the instant application.

The unit (a3) of Hada et al. (par.0034-0035) is equivalent to the unit (II) of Fujishima et al. and the unit (a4) of the instant application.

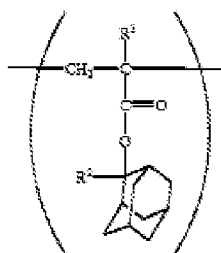
Due to the fact that the units (a1), (a2) and (a3) of Hada et al. are equivalent to the units (I), (II), (III) of Fujishima et al., it would have been obvious to one of ordinary skill in the art at the time of the invention to use the unit (a4) of Hada et al. as structural unit in the resin of Fujishima et al., in order to obtain a resin with excellent resolution and which enables improvement in the depth of focus range of an isolated resist pattern and suppression of any proximity effect (par.0010).

Hada et al. further disclose that the unit (a4) is preferably tricyclodecanyl (meth)acrylate, adamantyl (meth)acrylate, tetracyclodecanyl (meth)acrylate, due to their commercial availability (par.0036). These units are equivalent to the units (a5) comprising an aliphatic polycyclic group derived from a methacrylate ester of the instant application.

With regard to claim 23, Fujishima et al. disclose a chemical amplifying positive resist composition comprising a resin and an acid generator (abstract) and a solvent (column 9, lines 1-15).

The resin comprises:

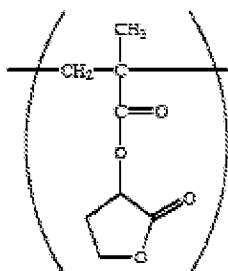
- an unit of 2-alkyl-2-adamantyl (meth)acrylate of formula (I):



(I) (formula (I) in column 2, lines 35-45), wherein R^1 represents hydrogen or methyl and R^2 represents an alkyl (column 2, lines 50-51).

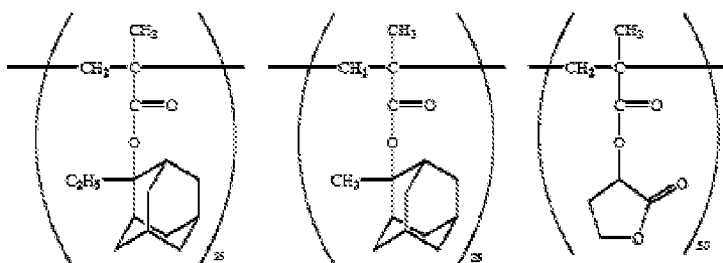
The alkyl-2-adamantyl in this unit is cleaved by the action of an acid and hence this unit contributes to the enhancement of alkali-solubility after exposure of the resist film (column 4, lines 44-51). Fujishima et al. further disclose that other polymerization units with acid-cleavable groups may be comprised in the resin (column 5, lines 56-59).

- an unit of α -methacryloyloxy- γ -butyrolactone represented by the formula (III):



(III) (formula (IV) in column 3, lines 14-15 and 25-35).

Fujishima et al. disclose the polymer (IV), which shows polymerization units with acid-cleavable groups used in combination:



(IV) (Resin I in columns 15-16).

The resin (IV) comprises:

- a first unit of 2-ethyl-2-adamantyl methacrylate which is equivalent to the unit (a1) of formula (I) of the instant application, wherein R is a methyl group and R¹ is an ethyl group;
- a second unit of 2-methyl-2-adamantyl methacrylate which is equivalent to the unit (a2) of formula (III) of the instant application, wherein R is a methyl group, and
- a third unit equivalent to the unit (a3) containing a lactone group of the instant application.

However, Fujishima et al. fail to disclose that the resin may comprise an unit (a5) comprising an aliphatic polycyclic group derived from a methacrylate ester.

Hada et al. disclose a chemically amplified positive type resist composition comprising a resin (A) for which the solubility in alkali increases under the action of an acid and an acid generator (B) which generates acid on exposure (par.0012), wherein the resin (A) is a copolymer comprising:

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- an unit (a1) derived from a (meth)acrylate ester comprising a acid dissociable, dissolution inhibiting group;
- an unit (a2) derived from a (meth)acrylate ester comprising a lactone containing monoecyclic or polycyclic group;
- an unit (a4) derived from a (meth)acrylate ester comprising a polycyclic group which is different from the unit (a1), (a2) and (a3) (par.0012).

The chemically amplified positive type resist composition of Hada et al. displays excellent resolution and enables improvement in the depth of focus range of an isolated resist pattern and suppression of any proximity effect (par.0010).

The unit (a1) of Hada et al.(par.0020-0023) is equivalent to the first and second repeating units of the polymer (IV) of Fujishima et al. and the units (a1), (a2) of the instant application.

The unit (a2) of Hada et al. (par.0028-0032) is equivalent to the α -methacryloyloxy- γ -butyrolactone unit of the polymer (IV) of Fujishima et al. and to the unit (a3) of the instant application.

Due to the fact that the repeating units of Hada et al. are equivalent to the units of the resin of Fujishima et al., it would have been obvious to one of ordinary skill in the art at the time of the invention to use the unit (a4) of Hada et al. as structural unit in the resin of Fujishima et al., in order to obtain a resin with excellent resolution and which enables improvement in the depth of focus range of an isolated resist pattern and suppression of any proximity effect (par.0010).

Hada et al. further disclose that the unit (a4) is preferably tricyclodecanyl (meth)acrylate, adamantyl (meth)acrylate, tetracyclodecanyl (meth)acrylate, due to their commercial availability (par.0036). These units are equivalent to the units (a5) comprising an aliphatic polycyclic group derived from a methacrylate ester of the instant application.

Response to Arguments

8. Applicant's arguments filed on October 10, 2008 have been considered but are moot in view of the new grounds of rejection.

On pages 8 of the Remarks, the applicant shows that the amended claims overcome the prior art rejections presented in the previous Office Action. However, new ground of rejection are presented above in paragraphs 4-7.

On page 9 of the Remarks, the applicant argues the unexpected results of the composition of the instant application, wherein said composition comprises a resin with units (a1), (a2), (a3) and (a4).

The results of the above-mentioned composition are compared with the results given by a composition comprising a resin with units (a2), (a3) and (a4) (Comparative Examples 1, 2, 4 and 5) and with the results given by a composition comprising a resin with units (a1), (a3) and (a4) (Comparative Examples 3 and 6).

However, these Comparative Examples do not show that the composition of the instant application leads to unexpected results when compared to the composition of

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Fujishima et al. which comprises a resin wherein the units (a1) and (a2) are used in combination.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANCA EOFF whose telephone number is (571)272-9810. The examiner can normally be reached on Monday-Friday, 6:30 AM-4:00 PM, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia H. Kelly can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/A. E./

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Examiner, Art Unit 1795

/Cynthia H Kelly/
Supervisory Patent Examiner, Art Unit 1795